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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/077,777	02/20/2002	Shigeki Matsuda	111995	3646

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EXAMINER	
WONG, EDNA	
ART UNIT	**PAPER NUMBER**
1753	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/05/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/077,777	MATSUDA ET AL.	
	Examiner	Art Unit	
	Edna Wong	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 January 2007 and 16 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 8-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 8-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 16, 2007 has been entered.

This is in response to the Amendment dated January 12, 2007. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Response to Arguments

Claim Objections

Claim **2** has been objected to because of minor informalities.

The objection of claim 2 has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 112

I. Claims **1-15** have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to

one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The rejection of claims 1-15 under 35 U.S.C. 112, first paragraph, has been withdrawn in view of Applicants' amendment.

II. Claims **1-15** have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The rejection of claims 1-15 under 35 U.S.C. 112, second paragraph, has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 103

Claims **1-15** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Matsuda** (US Patent No. 5,645,706).

The rejection of claims 1-15 under 35 U.S.C. 103(a) as being unpatentable over Matsuda is as applied in the Office Actions dated January 15, 2004, August 24, 2004, May 9, 2005, November 29, 2005 and July 12, 2006 and incorporated herein. The rejection has been maintained for the following reasons:

Applicants state that Matsuda nowhere discloses, and actually teaches away from, a pH of less than 2.0, and only a fraction of its overly broad ORP range (460-860 mV) actually causes Fe to remain in solution. For at least these reasons, the limitations

of instant claim 1, based on extensive experimentation and having produced unexpected and superior advantages, would not have been obvious over Matsuda.

In response, Matsuda teaches that the phosphate chemical treatment bath is a solution of pH of 2-4 (col. 8, lines 23-27). A pH of 1.9, for example, would have been less than a pH of 2. A *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties (MPEP § 2144.05).

Matsuda teaches that the oxidation-reduction potential of the phosphate chemical treatment bath is preferably 250-650 mV which preferably corresponds to 460-860 mV of a hydrogen standard electrode (col. 13, lines 13-18). In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists (MPEP § 2144.05).

Response to Amendment

Claim Rejections - 35 USC § 112

Claims **2, 8, 13 and 14** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2

line 3, "the metal ions that form the complex ***with phosphoric acid***" lack antecedent basis.

lines 4-7, "the metal material ***article*** for which the dissolution-precipitation equilibrium potential at which the ions dissolved in the phosphate chemical treatment bath are reduced and precipitate as the metal is greater than or equal to -830 mV" lacks antecedent basis.

line 5, it appears that "the ions" are the same as the metal ions recited in claim 1, line 10. However, it is unclear if they are. If they are, then it is suggested that the word -- metal -- be inserted after the word "the".

Claim 8

line 2, "the metal ions that form the complex ***with phosphoric acid***" lack antecedent basis.

Claim 13

line 5, "the gases" lack antecedent basis.

Claim 14

lines 2-3, recite "wherein an oxidation-reduction potential of the treatment bath is equal to or greater than ***-840 mV***". Parent claim 1, lines 15-17, recite that "the oxidation-reduction potential (ORP) of said phosphate chemical treatment bath indicated as the potential relative to a standard hydrogen electrode, is maintained at ***equal to or greater***

than 770 mV, and is used to monitor the treatment bath". -840 mV (a negative value) is not equal to 770 mV, but is it greater than 770 mV?

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **1-2 and 8** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **EP 1,074,640 A1** ('640).

EP '640 teaches an electrolytic phosphate chemical treatment method of forming a film composed of a phosphate compound and a metal that is reduced and precipitated from an ionic state on the surface of a metal material article to be treated, comprising:

performing the electrolytic treatment on said article **2** to be treated in a phosphate chemical treatment bath **1** by contacting said metal material article having electrical conductivity with said phosphate chemical treatment bath containing:

(i) phosphate ions,

(ii) phosphoric acid,

(iii) nitrate ions,

(iv) metal ions that form a complex with phosphate ions in said phosphate chemical treatment bath, and

(v) metal ions for which the dissolution-precipitation equilibrium potential at which the metal ions dissolved in said phosphate chemical treatment bath are reduced and precipitate as metal is equal to or greater than -830 mV, which is the cathodic reaction decomposition potential of water when indicated as the hydrogen standard electrode potential (page 6, [0041]; and page 24, Table 5),

and the treatment bath has a pH of less than 2 (= a pH of 0.5-5.0) [page 20, [0189]; page 22, [0218]; and page 24, Table 5] and is substantially free of metal ions, other than those which are a component of the film which will form sludge (page 11, [0110]);

wherein the oxidation-reduction potential (ORP) of said phosphate chemical treatment bath indicated as the potential relative to a standard hydrogen electrode is maintained at equal to or greater than 770 mV (= 200-1000 mV) [page 24, Table 5].

The electrolytic treatment uses for an electrode material that dissolves in the treatment bath [1]the metal ions that forms the complex with the phosphoric acid and the phosphate ions in the phosphate chemical treatment bath (= a working electrode **3** comprised of a metal material that forms a complex with phosphate in the phosphate

chemical treatment bath) [page 19, [0176]; and Fig. 3], [2]the metal material article from which the dissolution-precipitation equilibrium potential at which the ions dissolve in the phosphate chemical treatment bath are reduced and precipitate as the metal is greater than or equal to -830 mV, which is the cathodic reaction decomposition potential of water when indicated as the hydrogen standard electrode potential (= a working electrode **4** comprised of a metal material for which the electrical potential at which ions dissolve in the phosphate chemical treatment bath are reduced and precipitate as metal is equal to or greater than the anodic electrolytic reaction potential of water as the solvent or greater than or equal to -0.83 V (indicated as the hydrogen standard electrode potential)) [page 19, [0176]; and Fig. 3]; or [3]a metal material that is insoluble during the electrolytic treatment.

The electrolytic phosphate chemical treatment method further comprises dissolving an amount of Fe ions into the treatment bath from an Fe electrode (= Fe is used for the film-forming metal electrode (anode)) and the article to be treated (= iron (steel material)), when performing a cathodic treatment (= cathodic electrolytic treatment) of said article to be treated and using the Fe electrode as the electrode that dissolves in the treatment bath (page 8, [0060]; page 15, [0143] to [0144]; and page 15, Table 4).

In a case where the article to be treated is a steel material (= iron (steel material)), the method further comprises dissolving an amount of Fe ions into the treatment bath in an anodic treatment (= anodic electrolytic treatment) in which said

steel material to be treated is dissolved as an anode (= dissolution (oxidation) reaction of the metal electrode) [page 8, [0059]; page 16, [0150] to [0153]; and page 15, Table 4].

The metal ions that form a complex with the phosphoric acid and the phosphate ions in the phosphate chemical treatment bath are at least one of Zn, Fe, or Mn ions (page 8, [0070]).

The oxidation-reduction potential of the treatment bath is equal to or greater than -840 mV (= between -0.83 V to 1.23 V) [page 22, [0219]].

The treatment bath is maintained in a constant state by measuring an oxidation-reduction potential value of the treatment bath and changing an amount and/or composition of replenishing chemical corresponding to the change in that value (= a control computer **11** for controlling the amount of replenishing chemical added, the applied voltage and so forth based on information from sensor **12** that measures the pH, the ORP and other parameters of the treatment bath) [page 19, [0179]].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **3-6 and 9-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over **EP 1,074,640 A1** ('640) as applied to claims 1-2 and 8 above, and further in view of **Matsuda** (US Patent No. 5,645,706).

EP '640 is as applied above and incorporated herein.

The method of EP '640 differs from the instant invention because EP '640 does not disclose the following:

a. Wherein the amount of Fe ions dissolved is controlled in order to make said ORP of the phosphate chemical treatment bath equal to or greater than 840 mV and maintain the amount of Fe ions within a solubility limit of Fe^{3+} ions, as recited in claim 3.

b. Wherein the amount of Fe ions that dissolves in the treatment bath from an Fe electrode in a cathodic treatment, are controlled so that the ORP of the phosphate chemical treatment bath is equal to or greater than 770 mV, as recited in claim 4.

Like EP '640, Matsuda teaches a phosphate chemical treatment by electrolysis. Matsuda teaches that if it is attempted to control the ORP of the treatment bath to 560 mV or greater, then it will be necessary to oxidize the Fe^{2+} to Fe^{3+} (col. 11, lines 60-62). Since at an ORP of 560 mV or greater, the treatment bath contains paramagnetic iron (Fe^{3+}). If Fe^{3+} dissolves in the treatment bath(s) and disappear leaving no Fe^{3+} in the treatment bath(s), the ORP will by necessity fall below 560 mV (col. 29, lines 37-47).

It would have been obvious to one having ordinary skill in the art at the time the

invention was made to have modified the amount of Fe ions dissolved described by EP '640 with wherein the amount of Fe ions dissolved is controlled in order to make said ORP of the phosphate chemical treatment bath equal to or greater than 840 mV and maintain the amount of Fe ions within a solubility limit of Fe^{3+} ions; and wherein the amount of Fe ions that dissolves in the treatment bath from an Fe electrode in a cathodic treatment, are controlled so that the ORP of the phosphate chemical treatment bath is equal to or greater than 770 mV because if Fe^{3+} dissolves in the treatment bath(s) and disappear leaving no Fe^{3+} in the treatment bath(s), the ORP will by necessity fall below 560 mV as taught by Matsuda (col. 11, lines 60-62; and col. 29, lines 37-47).

Matsuda teaches that a secondary electrolytic cell **14** is provided for this purpose (col. 11, line 63 to col. 12, line 3; and Fig. 3). The secondary electrolysis system **B** is constructed with metal materials such as iron and nickel, etc. (col. 11, lines 12-20).

c. Wherein an electrode is used in the electrolytic treatment for making the ORP of the phosphate chemical treatment bath equal to or greater than 770 mV is an insoluble metal material, as recited in claim 5.

EP '640 teaches a dormant electrolytic anode **8** comprised of inert material with respect to the phosphate chemical treatment bath used when the article to be treated does not make contact with the phosphate chemical treatment bath (page 19, [0178]; and Fig. 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the electrolytic treatment described by EP '640 with wherein an electrode is used in the electrolytic treatment for making the ORP of the phosphate chemical treatment bath equal to or greater than 770 mV is an insoluble metal material because when the article to be treated does not make contact with the phosphate chemical treatment bath, a dormant electrolytic anode **8** comprised of inert material with respect to the phosphate chemical treatment bath would have been used as taught by EP '640 (page 19, [0178]; and Fig. 3).

The Applicants have a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

d. Wherein a chemical that contains Fe ions which replenishes the phosphate chemical treatment bath is an Fe-phosphate complex in order to make the ORP of said phosphate chemical treatment bath equal to or greater than 770 mV, as recited in claim 6.

EP '640 teaches when replenishing components of the phosphate chemical

treatment bath, it is preferable to remove a portion of the phosphate chemical treatment bath, and add replenishing liquid containing bath components at a higher concentration than the concentration of at least one component among the components that compose the phosphate chemical treatment bath with respect to the bath that has been removed (page 9, [0077]; and page 19, [0178]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the phosphate chemical treatment bath described by EP '640 with a chemical that contains Fe ions which replenishes the phosphate chemical treatment bath is an Fe-phosphate complex in order to make the ORP of said phosphate chemical treatment bath equal to or greater than 770 mV because the electrolysis tank is extremely electrochemically active. If an active chemical was added to that active tank at a concentration greater than the treatment bath, the chemical component ions react before dissolving in the bath resulting in greater susceptibility to the formation of sludge (page 20, [0187]).

Furthermore, it has been held that a newly discovered use or function of components does not necessarily mean the system is unobvious since this use or function may be inherent in the prior art. *Ex parte Pfeiffer* 135 USPQ 31.

e. Wherein N_2O_4 gas generated and dissolved in a treatment tank is removed from the treatment bath by separating the treatment tank into an electrolytic treatment tank that carries out the electrolytic treatment and an auxiliary tank that does

not carry out the electrolytic treatment, circulating the treatment bath between the two tanks, and providing a mechanism that opens liquid of the treatment bath to the atmosphere either between the electrolytic treatment tank and the auxiliary tank or within the electrolytic treatment tank and the auxiliary tank, as a means of separating the N_2O_4 gas generated in the treatment bath accompanying the electrolytic treatment of the treatment bath, as recited in claim 9.

f. Removing, through a liquid circulation circuit, a portion of the treatment liquid at a location prior to being introduced into a filter material in a filter, exposing the removed treatment liquid to the atmosphere, and returning it to the electrolytic treatment tank after separating the gases in the form of nitrogen oxides present in the treatment liquid, as recited in claim 13.

EP '640 teaches that it is preferable to remove a portion of the phosphate chemical treatment bath from a bath tank having the phosphate chemical treatment bath, to thermodynamically stabilize the energy state of the portion as a liquid, of the phosphate chemical treatment bath, and to later return it to the bath tank (page 9, [0074]).

EP '640 teaches that a filtration/circulation pump **6** for removing a portion of the phosphate chemical treatment bath **1** from inside the bath tank (page 19, [0177]). A filter **7** removes solids that have precipitated in the phosphate chemical treatment bath **1** during the course of the film formation reaction (page 19, [0177]).

The invention as a whole would have been obvious to one having ordinary skill in

the art at the time the invention was made to have modified the treatment bath described by EP '640 with N_2O_4 gas generated and dissolved in a treatment tank is removed from the treatment bath by separating the treatment tank into an electrolytic treatment tank that carries out the electrolytic treatment and an auxiliary tank that does not carry out the electrolytic treatment, circulating the treatment bath between the two tanks, and providing a mechanism that opens liquid of the treatment bath to the atmosphere either between the electrolytic treatment tank and the auxiliary tank or within the electrolytic treatment tank and the auxiliary tank, as a means of separating the N_2O_4 gas generated in the treatment bath accompanying the electrolytic treatment of the treatment bath; and removing, through a liquid circulation circuit, a portion of the treatment liquid at a location prior to being introduced into a filter material in a filter, exposing the removed treatment liquid to the atmosphere, and returning it to the electrolytic treatment tank after separating the gases in the form of nitrogen oxides present in the treatment liquid because EP '640 discloses a method at least in a similar manner as instantly claimed. Similar processes can reasonably be expected to yield products which inherently have the same properties. Therefore, one having ordinary skill in art would have expected that N_2O_4 gas was generated from the reaction of components in the treatment bath disclosed by EP '640, and the removed portion of the phosphate chemical treatment bath would have been opened to the atmosphere during the circulation of the treatment bath where the N_2O_4 gas would have been released into the atmosphere.

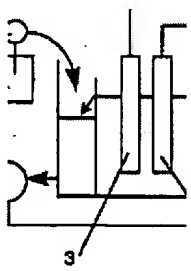
g. Wherein the auxiliary tank that does not carry out the electrolytic treatment has a mechanism in which the treatment liquid is passed through a permeable solid structure, as recited in claim 10.

h. Wherein the solid structure is a film, as recited in claim 11.

EP '640 teaches that it is preferable to remove a portion of the phosphate chemical treatment bath from the bath tank having the phosphate chemical treatment bath, and remove the solids that precipitated during phosphate chemical treatment during the course of the film formation reaction, followed by returning it to the bath tank (page 9, [0075]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified auxiliary tank described by EP '640 with wherein the auxiliary tank that does not carry out the electrolytic treatment has a mechanism in which the treatment liquid is passed through a permeable solid structure; and wherein the solid structure is a film because permeable thin film membranes are conventionally used to partition processing tanks.

EP '640 shows the phosphate chemical treatment bath **1** passing through a solid structure into the auxiliary tank (Fig. 3):



i. Wherein a filter having a mechanism that filters the treatment liquid is used for the auxiliary tank that does not carry out the electrolytic treatment, as recited in claim 12.

EP '640 teaches that a filter **8** removes solids that have precipitated in the phosphate chemical treatment bath **1** during the course of the film formation reaction (page 19, [0177]).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Edna Wong
Primary Examiner
Art Unit 1753

EW
March 27, 2007